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THE RENAISSANCE OF THE ALCHEMISTS.

BY JOSEPH HORNOR COATES.

"*E pur si muove.*" And as the planet in its forward march through space makes its progress in a series of diurnal revolutions with alternating periods of light and darkness, and in a never-ending circling around its central sun never traverses exactly the same track but comes almost back to the same places only always a little further on through the infinite expanse, so there often seems to be a corresponding system of progress in the world of thought and knowledge. We leave behind us in the darkness the worn-out knowledge of the past, we bask in the light of the superior acquirements of our own age, and suddenly we come back again, as if in a circle, upon something that is so curiously like what we had supposed was abandoned in bygone ages that it almost seems our progress has been but a phantasm and we have gone back again upon the same old track. But there is a difference; we have revolved in a circle but we have gone forward too; we have made a genuine advance in knowledge of the truth.

There has periodically been, there is perhaps now, a notable recurrence to the mysticism which alternates with rationalism in a perennial appeal to the human intellect and the human impulse to penetrate and to account for the mysteries of existence, to make plain the conditions of life and the material world upon which it is dependent. Only a few years ago, we seemed fairly committed, at least so far as physical science was concerned, to a materialistic standpoint from which to march forward in pursuit of knowledge. Perhaps it is so yet; perhaps, however, our view of materialism is to be modified and expanded by what has heretofore seemed mystical, with a resulting broadened and truer insight. At all events, recent discoveries in physics and chemistry would, a short time ago, have been classed with the fantastic chimeras of the alchemists whose transcendental enthusiasm was the actual generative power in the birth of modern chemistry and physical science. We seem to get back again, from time to time, to the exploded theories of the past, with a little difference in theory that makes an enormous difference in the validity of the acquirement. And, as the alchemist Paracelsus, the progenitor of modern medical experimental science, says in his *Philosophia Occulta,* "things that are considered now to be impossible will be accomplished; that which is unexpected will in future prove to be true, and that which is looked upon as superstition in one century will be the basis for the approved science of the next."

No doubt, much of the mystical phraseology in which the alchemistical philosophers appear to sink rational thinking may have been used to preserve the strictly esoteric character of the physical science they were engaged in developing, and as a necessary precaution against the inconveniences, to say nothing of the dangers, to which an open avowal of knowledge often subjected its possessor, as Galileo and many another searcher after truth found to his cost. But however that may be, there is an unquestionable basis of genuine mysticism underlying their doctrines, as the inspiration of their labors and the sustaining power by which work was carried on under unfavorable and disheartening conditions and with crude and meagre appliances; and hand in hand with the mystic vision prying into the secrets of nature goes a truly scientific concept of the natural causes of all things. Thus Paracelsus, in the midst of his philosophy of the "elemental spirits" which dwell in the four "elements" of earth, air, fire and water, does not hesitate to say:

> "The evil spirits are, so to speak, the bailiffs and executioners of God (the Law). They have been called into existence by the influences of evil, and they work out their destiny. But the vulgar have a too high estimate of their powers, especially of the power of the devil. The devil has not enough power to mend broken old pots, much less to enrich a man. He—or it—is the poorest thing that can be thought of, and poorer than any being that can be found in the four elements. There are a great many inventions, sciences, and arts that are ascribed to the agency of the devil; but, before the world grows much older, it will be found that the devil has nothing to do with such things, that the devil is nothing and knows nothing, and that such things are the result of natural

> causes. True science can accomplish a great deal; the Eternal Wisdom of the existence of all things is without a time, without a beginning, and without an end."

Truly, that may have been heresy, scientific as well as theologic, in the sixteenth century and later; but in the twentieth we can have no serious quarrel with it. Firmly believing in the inherent evil that lies in ignorance of natural law, and that disease germs are almost literally "evil spirits called into existence by the influences of evil," and "executioners" of the sanitary law, the law of God, when we violate it, the statement might have been written yesterday.

So, too, of the alchemist Roger Bacon, six hundred years and more ago and three centuries before Paracelsus, it can be said:

> "Having undertaken to demonstrate that, by the help of natural science, it is possible to actually perform the pretended prodigies of magic, he further assures us that machines may be constructed for navigation without the aid of rowers, in such a manner that vessels will be borne through the waters with extraordinary velocity, under the direction of a single man. 'It is equally possible to construct cars which may be set in motion with marvellous rapidity, independently of horses or other animals. Flying-machines may also be made, the man seated in the centre, and by means of certain contrivances beating the air with artificial wings.' In the same way Bacon anticipated the invention of the crane, diving apparatus, suspension-bridges, etc. These things, he declares, were known to the ancients, and may still be recovered."

Considering that Friar Bacon was imprisoned, in the year 1298, "and forced to confess his repentance of his pains in the arts and sciences," considering how many of his successors were visited with even worse pains as punishment for their acquisition of knowledge, it can scarcely be wondered at that an esoteric doctrine was for them much safer than one open and confessed. It is quite beside the mark—in this era of unlimited freedom of opinion and belief—to condemn those who possessed knowledge, in an age of almost universal ignorance, on the simple ground that they chose to clothe it in mystery, to erect their science into a secret philosophy and to express it in a jargon intelligible only to the initiated. Whether or not their possession of the secret processes of the *magnum opus* was a mere delusion, or even an imposture, the fact that — like the famous Scotch alchemist, Alexander Seton, or Sethonius, who was imprisoned by the Elector Christian II of Saxony and tortured to force a revelation of his secrets—those who avowed knowledge beyond the ordinary walked in constant danger, is quite sufficient justification of a concealment that now we are apt to look upon as at the least suspicious, at the best a mildly contemptible puerility. Genuine mysticism, of course, plays its part, as well. Mystics are apt to have a hard time of it in contact with the rugged materialism of a cold workaday world. The inevitable tendency is to seek companionship with kindred spirits apart from the unappreciative or hostile world, to guard jealously the convictions that make life valuable, and to speak in parables. In those times, holding secret the possession of knowledge seems to have been a cardinal point of faith, as well as a precaution. Seton was pierced with pointed iron, scorched with molten lead, burnt by fire, beaten with rods, racked from head to foot, yet his constancy never forsook him. Even Sendivogius, who rescued him from all this and sought to be his disciple, he refused to teach, saying, "You see what I have endured. My nerves are shrunk, my limbs dislocated; I am emaciated to the last extremity, and my body is almost corrupted; even to avoid all this I did not disclose the secrets of philosophy." It is not a satisfactory explanation of this to say that he revealed nothing because he knew nothing. A confession of imposture would certainly not have increased his torments, and probably would even have relieved him. He thought he knew, but would not tell. And Seton's case is but one out of many.

So that it is quite conceivable, it is even quite probable, that these mystical, pertinacious and secret investigators of the mysteries of medicine and chemistry really discovered more than ever was told, and which the modern chemist and the medical investigator of a freer age are to find out anew. Arnold de Villanova, in the thirteenth century, is accused of "attempting to create a man by means of certain drugs deposited in a pumpkin"; and here in America a short time ago a distinguished scientist of Chicago announced that he had found the origin of life in certain chemical combinations. Yet he is not derided; his results are respectfully considered, and they are rejected not because they are impossible, but because they are not yet proved. Indeed, the possibility is conceded, and that concession carries with it the possibility of what Arnold is said to have attempted and the possibility of the "*homunculus*" of Paracelsus, however improbable either may really be. So, too, the modern doctrine of the indestructibility of matter is not really new; it is found in the writings of Paracelsus, and I suppose ages before him. And the alchemistic theory of "Universal Development"—no doubt in itself a very ancient concept—seems to bear a distinct generic relation to the doctrine of evolution, whose formulation by Charles Darwin revolutionized, or perhaps it would be fair to say created, modern thought. Really, when Paracelsus speaks of the "*Limbus*," the "*Mysterium magnum*" or "*Primordial Matter*," the *mucilage* "containing the germs of life, out of which, by *generatio æquivoca,* first the lower and afterwards the higher organisms are formed," it sounds very like a modern scientist talking about protoplasm; and when he says, "Separation is the cause of existence, the birth of things from the *Mysterium magnum*,"—is that very different from a literal statement of growth by separation of protoplasmic cells?

In this recent acceptance of ancient thought in a new form, it may not be difficult to trace a direct transmission of the concept through the ages from one mind to another; but in the discovery of microbes and the general acceptance of the quite recent theories of germ diseases there is a very curious and independent verification of much that makes up the mystic, poetic and fantastic pneumatology of the alchemistical philosophers. Their concepts as to the invisible denizens of the alchemistic "four elements of fire, water, air and earth," have been in recent years strikingly realized by the discovery of actual fact as to three of the elements, leaving fire out of the account, although if I am not mistaken there are organisms that even a very considerable degree of heat does not destroy. They conceived the existence of "elemental spirits," salamanders in fire, undines or nymphs in water, sylphs in the atmosphere, gnomes in earth, all living organisms invisible because transparent and impalpable; we may know of no salamanders, but as to the rest, we know that these living organisms do exist and are invisible only because of their microscopic size, a condition of invisibility which, apparently, did not impress itself upon the mind of the ancient mystic. Instead of the more poetic names, we call them all microbes, or spores, or microzoa, or, in general, micro-organisms; but, after all, the essential conditions of microscopic life seem to have been fairly well conceived by the alchemists, and other still more ancient Hermetic philosophers, in a mystic way; and it is hard to tell how far their concepts are purely mystical or are hard materialism of belief hidden under a mystic phraseology. What they speak of as elemental spirits, the microscope practically reveals to us as living, material beings.

And as the microscope has revealed, and is still revealing, forms of life before unknown if not unsuspected, so the invention of instruments vastly higher in magnifying power would unquestionably reveal forms of life that are now beyond our reach. And it is very possible that our condition and the springs of our action from day to day may be much more under the influence of these myriads of living organisms that closely environ us than we should dare to imagine in our present state of knowledge—or of ignorance. The belief of a few centuries ago that this crowd of living beings, invisible and impalpable under ordinary conditions, some of them actively malignant, ravening to do us injury, others as actively benevolent and guarding us against their ravages, others still merely impassive and indifferent,—this speculation of those old and discredited philosophers, which has been looked upon as a crazy fancy, the microscope shows to be almost literally true. Instead of spiritual beings, demons and guardian attendants, we call them microzoa. Some are bitterly dangerous; some are protective, antagonizing and preying upon those hostile to us; and some are simply harmless. If the alchemist, or Hermetic philosopher, could have been equipped with a pair of spectacles of very high microscopic power, he might have actually seen very much what he did see by the eye of his spiritual vision. Indeed, it is conceivable that a condition of the eye, the optic nerve, and the apprehensive power of the brain—a state of supreme exaltation—might be brought about that would vastly magnify the power of eyesight temporarily, and would actually make these micro-organisms visible to the unaided eye. As it is, every minute object, not even larger than a blood corpuscle, which comes within the field of vision, does actually impress its image on the retina, and it is due to the limited power of the nerve to transmit the impression, and of the brain to apprehend it, that it fails to reach our consciousness. As Sherlock Holmes says to Dr. Watson, "You see, but you do not observe." The smallest object that will make a visual impression on the retina—that is, whose image will touch two retinal cells at once—is in size about four micro-millimetres or microns, approximately the sixty-five hundredth part of an inch. You really see it, but you do not know you see it; the brain does not record the impression. The various germs and spores floating in the air vary from a much greater size than that to a much less, so that many of them are really seen by the naked eye, although the brain is not conscious of it; and perhaps it is not impossible that, under conditions of great excitement, or hypersthenia the retinal cells might contract and shrink together so that the image of an object still smaller than four microns would cover two cells at once and so become visible. It is also conceivable that, in such a conjectural hypersthenic state, the lenses of the eye might temporarily undergo such functional and structural modifications as would give them more or less microscopic power and so deepen the range of vision, bringing still smaller objects into its field. Yet further, bearing in mind that we commonly judge of the size of what we see by the distance at which it is supposed to be and that an object which is in reality close by, but which is thought to be at a distance, appears of much greater proportions than it really is, it is readily conceivable that very minute objects, made suddenly visible in the manner suggested, if close to the eye or floating on its surface and imagined to be at a distance, would attain formidable apparent dimensions; and some forms of microzoa might well appear as frightful monsters, especially when we take into consideration the tricks that effects of light and shade often play, with which the microscopist is familiar.

To carry the thought a little further, the elixirs, the ceremonies and incantations that were supposed to be the means by which the initiate attained the temporary power of seeing these ordinarily invisible beings, and of which Bulwer gives so graphic a picture in his novel, "Zanoni," may certainly be conceived as being causes producing an abnormal exaltation of the nervous system and of visual power. The ordeal of entrance into these occult mysteries was spoken of as very dangerous to the neophyte, and not to be entered upon without long and rigorous bodily and spiritual preparation; which is entirely consistent with the speculation that is here suggested, since high nervous excitement is often more or less dangerous, and the elixirs may have been powerful nerve excitants, highly poisonous in overdoses.* It was a time when much attention was given to the concoction of subtle poisons; and, no doubt, some were discovered the knowledge of which has been lost, a natural result of treating scientific research as esoteric doctrine.

But, whatever their vagaries, these Hermetic philosophers appear to have been often close to the truth, and to have missed it only by narrow margins. The theory that we are surrounded by living invisible beings, who exercise a powerful influence on us, was long supposed to be one of their wildest dreams, yet it is now known to be substantially true. The invisibility they appear to have attributed to mysterious occult conditions is really due simply to smallness of size; and that is the essential difference between their concept and the actual truth. The celebrated English alchemist, Doctor Robert Fludd, who published a defence of the Rosicrucian philosophy in 1616, and who has come down to us in history simply as a charlatan, held that "every disease had its peculiar demon who produced it, which demon could only be combated by the aid of the demon whose place was directly opposite to his"; but really if "demon" is translated into "microbe" on one side and "antitoxin" on the other, the majority of the medical profession to-day would come close to saying the same thing.

The doctrine, indeed, is a very ancient one. Dr. Meryon, in his "History of Medicine," speaking of the Gnostics of the early Christian centuries, says:

> "In medicine they launched out into the wildest speculations, and delivered themselves over to the guidance of disordered imagination. They believed in the mysterious hierarchy of the invisible world; and

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* It is said of Paracelsus that he held "there are some poisons by which the organic activity of the body may be suppressed for a time, and the consciousness of the inner man rendered more active, and which may therefore enable us to see the things on the astral plane. But such poisons are destructive of reason, and very injurious to the health." And another authority says: "One of the most effective fumigations for the purpose of causing apparitions was made of the following substances: hemlock, henbane, saffron, aloe, opium, mandrake, solanum, poppy-seed, assafœtida and parsley." Of course, "apparitions" raised by so poisonous a concoction quite probably were merely the illusions of an opium dream; but, at the same time, it is conceivable that an exaltation of the optic nerve and brain may have been produced in some such manner as that suggested.

> were led to the doctrine of demons as the authors of all bodily infirmities."

Make allowance for mystical expression of ideas, substitute "microzoa" for "demons," and Gnostic doctrine does not seem as wild as it did when Dr. Meryon wrote his history, not so long ago. The modern scientist believes firmly in the influence of the "invisible world" which the microscope reveals.

So too when Paracelsus, speaking of a certain physical product, says, "It may decompose and become a strong poison, furnishing life to innumerable invisible existences, by which epidemics and plagues may be caused," he seems working quite on the same lines as the modern physician, and to be quite close to the germ theory of disease. And the fact that "fumigations to drive away evil spirits were made of sulphur, assafœtida, castoreum, and more especially of hypericum and vinegar," shows the strongest relation to modern methods of combating germ disease by precisely the same method of fumigation, although doubtless we have a better choice of disinfectants.

Many of the sayings of Paracelsus, which seemed mere quackery to the orthodox physician of his day and generation, are in what we are wont to plume ourselves is a distinctly modern vein. As, for instance:

> "The physician should be an alchemist; that is to say, he should understand the chemistry of life. Medicine is not merely a science, but an art; it does not consist merely in compounding pills and plasters and drugs of all kinds, but it deals with the processes of life which must be understood before they are guided. . . . A powerful will may cure where doubt will end in a failure."
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> "The physician should be well versed in physical science. He should know the action of medicines and learn by his own experience and by the experience of others. He should know how to regulate the diet of the patient, and neither overfeed nor starve him. He should know the ordinary course of disease, and the premonitory symptoms; for a disease is like a plant, which may grow to be a big tree if it is not rooted out when it is young. A child may cut down an oak when it first comes out of an acorn; but in time it will require a strong man and an axe to cut it down."
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> "He who can cure disease is a physician. To cure disease is an art which cannot be acquired by the mere reading of books, but which must be learned by experience."
>
> "In many cases of lost vitality the weakened organs may recover their strength after a time of rest and cessation of abuse. Nature is a

> patient mother that often forgives the sins committed against her, although she cannot forget them. We may therefore often trust to her recuperative powers, and Nature may be able to restore that which has not been irrevocably lost; for Nature is a great physician."

All this sounds like a series of extracts from the opening address of some professor to a class in a modern school of medicine, instead of the heresy of the sixteenth century. If this be alchemy in medicine, we have come round to it again. Paracelsus's doctrine, no doubt not original with him but much older, that an "evilly disposed mind" may originate a plague epidemic is almost literally realized in the modern medical knowledge that an "evilly disposed" body may do exactly this thing—whether it be an epidemic of smallpox or of typhoid. The radiation of virulent—dæmoniac, if you will—seeds of infection which he conceives of, or at least expresses, in a mystical and transcendental sense, we know as a strictly physical phenomenon; and we possibly ignore now, to be recognized in the future, some actual psychic force in the same direction—electrical or radioactive, it may be—which complements and energizes the contaminating physical infection that our science has proved and so acknowledges.

One of the gravest indictments against the alchemists has been their belief in the possibility of the transmutation of metals—that, by chemical means, base metals could be transformed into gold—and their claims to the actual practice of the art. In the first volume of the "Encyclopædia Britannica," one of the contributors to that monument of exact information says:

> "Alchemy was, we may say, the sickly but imaginative infancy through which modern chemistry had to pass before it attained its majority, or in other words became a positive science. The search for gold was only one crisis in this infancy. There is no longer any need to exhort adventurous spirits, who hope to find Golconda at the bottom of their crucibles, to leave such visions and turn to the safer paths of science or industry. The battle has been fought and won, the problem of the unity of chemical elements or simple bodies belongs rather to the province of metaphysics than to that of experimental science. If here and there an honest student of the black art still survives, he is regarded as a mad but harmless enthusiast; and as for the pretended searchers for the philosopher's stone, they are, if possible, less interesting objects than the dupes they still continue to cheat."

This was written little more than thirty years ago; yet, in that short space of time, the complacent conviction as to the fixed and final knowledge of the nature of chemical elements or "simple bodies" has given place again to doubt and further investigation. The problem of their unity, it may be fairly said, has been taken out of the "province of metaphysics" and again relegated to "that of experimental science." The battle appeared to be fought and won; but, like the Russians and Japanese at Liaoyang, the victory somehow does not seem to preclude the speedy reopening of the conflict. It is well not to be too sure that we have ever attained the sum and substance of final knowledge in matters of scientific attainment. If we do not agree with Paracelsus that the superstition of one century may be the science of the next, we at least know that the converse has often proved true. And we are continually harking back to the failures of the past for the solid basis of some brilliant achievement of the present. The invention of breech-loading firearms, for instance, is one of the great successes of the nineteenth century and quite revolutionized the art of war; yet this was one of the earliest forms of those weapons of civilization with which we enforce upon inferior peoples the knowledge of better things. It was cast aside as a failure, to be afterwards taken up again as a great success.

So, too, with the exact and apparently final knowledge of chemical elements of a few years since. It is not so surely exact, and now by no means admitted to be final. The possibility of very different knowledge is admitted by all. The discovery of radium and radioactive bodies has opened a new vista in chemical science which may stretch out to undreamed-of fields, in which we may find some of the discarded concepts of the past. On his recent visit to America to attend the convention of the Society of Chemical Industry, the eminent British chemist, Sir William Ramsay, after speaking of having recently stumbled upon a "new substance which might possibly be the key of new discoveries," is reported to have said: "It seems to me that we may be on the eve of the discovery of the origin of the ordinary elements, which may be the breaking down of radioactive elements of high atomic weight." This statement was received with enthusiastic acclaim by the assembled chemists to whom it was addressed, and who represent the accepted thought in their branch of knowledge. It seems impossible not to recognize that it points directly to the ultimate "unity of chemical elements" as a distinct scientific possibility, and perhaps more directly to the possible chemical identity of the metals in a common origin; and, if this be so, then the transmutation of metals is established as a scientific possibility, and the practice of the *magnum opus,* or the artificial manufacture of gold, becomes again a legitimate aim of scientific research—if it should be worth while.

Indeed, at a later date, Sir William Ramsay, in his paper called "Radium and Its Products," published in "Harper's Magazine" for December, 1904, commits himself definitely to this view. He says:

> "If, as looks probable, the action of β-rays, themselves the conveyors of enormous energy, on such matter as glass, is to build up atoms which are radioactive, and consequently of high atomic weight; and if it be found that the particular matter produced depends on the element on which the β-rays fall, and to which they impart their energy:—if these hypotheses are just, then the transmutation of elements no longer appears an idle dream. The philosopher's stone will have been discovered, and it is not beyond the bounds of possibility that it may lead to that other goal of the philosophers of the dark ages—the *elixir vitæ.* For the action of living cells is also dependent on the nature and direction of the energy which they contain; and who can say that it will be impossible to control their action, when the means of imparting and controlling energy shall have been investigated?"

This is pure alchemy and brings the speculations of the alchemists—and their achievements, if they attained any—distinctly within the purview of modern science.

Then too, the theory of Professor J. J. Thomson, based on the researches of Professor Crookes and other physicists, casts aside the old theories of the separate and individual atom or chemical unit of each different chemical element—whether it be the unbreakable solid of the old Greeks, the mere centre of force of Boscovich, or the vortex ring of Lord Kelvin—and holds that the basic element of all atoms, of every substance, is one and the same, a congeries of "electrons," or corpuscles in a high degree of motion; the atoms of various chemical elements differing in weight according to the number of electrons they may severally contain. If, therefore, in the ultimate analysis, it proves true that all forms of matter are reducible to an identical primary electron, it is certainly theoretically possible to reverse the process by which any chemical element has assumed its present form; and having reached the point where it branched off from other forms of matter, to reconstruct it along new lines until it is built up into the special form desired. And while there is no theoretic difficulty about this process, it is certainly true either that the practical difficulties may be found insuperable, or on the other hand that some simple short cut may be discovered that will make the process of conversion an easy one. Should this come about, it is but reasonable to suppose that a group of closely related substances, like the metals, might afford the earliest and easiest field for the demonstration of such a converting process. All of which is also apparently pure alchemy but not repugnant to modern science as well.

One of the more recent historians of alchemy and the alchemists, writing about twenty years ago, says:

> "The physical theory of transmutation is based on the composite character of metals, on their generation in the bowels of the earth, and on the existence in nature of a pure and penetrating matter which, applied to any substance, exalts and perfects it after its own kind. This matter is called 'The Light' by Eugenius Philalethes and by numerous other writers. . . . All the elements which enter into the composition of metals are identical, but they differ in proportion and in purity. In the metallic kingdom, the object of nature is invariably to create gold. The production of the baser metals is an accident of the process, or the result of an unfavorable environment."

If, therefore, what Eugenius calls "The Light" is what is now called radioactivity, and there is a certain kinship between the expressions, the alchemistical theory of transmutation and Sir William Ramsay's statement have possibly a close relation.*

Of Heraclitus of Ephesus, in the fifth century before the Christian era, it is said: "Maintaining that fire alone was the principle of all things, he regarded generation as an ascending road, *i. e.*, a volatilization, and decomposition as a descending road, *i. e.*, a fixation." If we consider, here, fire and radioactivity to be equivalent terms, as they may well be in the sense of Heraclitus's thought, Sir William Ramsay may yet prove that the ancient philosopher's concept was near to the truth. At all events, the two statements of the old and the new thought bear a certain curious resemblance. It may be that, among those ancient and almost forgotten investigators into the secrets of nature, there was some knowledge of what we now call radioactivity and radioactive bodies, and that this was the foundation of their philosophy. It may well be, too, that the practice of treating their attainments in physical research as an esoteric doctrine, to be communicated only to the initiate and to be expressed only in fantastic forms—a necessity imposed either by the exigencies of the times or by their own mystical temperament—has been responsible for a loss to the world of definite scientific results that are now being rediscovered in an age when they are welcomed as practical attainments instead of dreams and chimeras. And so, perhaps, the renaissance of alchemy, the rebirth of the alchemists, is taking place on a higher and better plane in the chemistry and the chemists of to-day.

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* About the year 1710, Schmolz de Dierbach, a lieutenant-colonel in the Polish army, is said to have obtained from Lascaris, a Greek alchemist, some "powder of projection" by which it is claimed he produced gold a number of times. This powder, it is said, "was of a red color, and a microscopic examination revealed its crystalline nature. It *increased the weight of the metals*, which it was supposed to transmute, to an extent which chemical authorities declare to be physically impossible." The report of an increase in weight is curious, and possibly significant in view of Ramsay's speculation that metals and other ordinary chemical elements may be the product of the breaking down of "elements of high atomic weight."

As in organic life the doctrine of evolution upset the old theories of the independent creation of every species, reducing them all to one common original progenitor, the primordial protoplasmic cell; so, in the inorganic kingdom, instead of, as at present, basing the whole creation upon some scores—I do not know just how many there may be at present — of individual irreducible chemical elements or simple bodies, the chemistry of the future may push its ultimate analysis to a point where it finds but one element, the progenitor of all the rest whose variations have been created by radioactivity or something to which that leads. Indeed, it may possibly be found that the force which is or lies behind radioactivity is the creative force, the generating cause, of all living things, including the primordial protoplasmic cell itself — that it is the essence of life. Then comes the thought that if, after all, radioactivity, or that of which it is the manifestation, should prove to be the formative force of creation, the spirit of things, we seem really quite close to the position of alchemistical philosophy that there is a spirit, or life, in everything, which determines its form and characteristics. And it is possible that there may have actually been the discovery of some radioactive body which was the mysterious "quint-essence," or fifth essence or element, the most important element of the "philosopher's stone" which was supposed to be the effective agent in the transmutation of metals. This quint-essence, or *prima materia,* is spoken of by alchemical writers as "the chief key to chemistry," which certainly has an interest in connection with Sir William Ramsay's statement. It is also said "to be a substance found everywhere and continually seen and possessed by those who are ignorant of its virtues." Indeed, if the philosopher's stone actually existed, it was apparently composed of very common substances. One writer says, "tenpence is more than sufficient to purchase the Matter of the Stone"; so that, when Sir William Ramsay discovers the secret of its composition, it is a satisfaction to know that it may be within the reach of all, since, if dissolved in alcohol, it is fabled to possess remarkable efficacy as a medicine in the cure of disease and in the prolongation of life.

It must be remembered that the great aim and object of the alchemistical philosophy was the elevation and exaltation of the human being to his ideal place, the development of the potentialities that lie in the organism of man, the cultivation of what we call "the soul" as the great source of growth and power. This philosophy seeks, as a minor object, to find the secret of making gold, simply because it is conceived to be the perfection, the final achievement, in the metallic kingdom, in which "the object of nature is invariably to create gold"; but, when the secret is found, its practical use is discouraged as dangerous to the one who has attained it and "useless in the end."

The discovery of which Sir William Ramsay thinks we may be on the eve may then, conceivably, bring with it the justification of those pertinacious and long-suffering investigators who wasted life and energy, who endured pains and torments, who were flouted and berated, in the vain search for the philosopher's stone and the means of transmuting metals; or it may prove that they were utterly astray. It would, however, probably justify them, in either event, as sincere and patient investigators into the secrets of nature even if unsuccessful seekers. One other thing it would do, if that has not already been done,—it would prove that those scientists who, thirty years ago and less, were writing of chemistry as then an exact science, based on final fixed knowledge of the nature of chemical elements as simple bodies, were almost as far in the wrong as the alchemists whom they flouted with amused derision.

The truth seems to be that the actual accomplishment of the transmuting of metals in the past is supported by a body of evidence quite as strong as that upon which we accept many historic facts. The evidence has been rejected because we seemed to have sufficient proof that the thing itself is impossible. If now or in the future that proof fails us, if it is admitted that the thing we believed incredible may, after all, be possible, then the historic evidence is to be accorded its proper weight, whatever that may be, and is to be treated as any other evidence.

Meantime, it may profit us to turn to the words of the Preacher, written thousands of years ago:

"One generation passeth away, and another generation cometh: but the earth abideth forever.

"The thing that has been, it is that which shall be; and that which is done is that which shall be done: and there is no new thing under the sun. Is there anything whereof it may be said, See, this is new? It hath been already of old time, which was before us."

JOSEPH HORNOR COATES.